Army Net Zero Installation Initiative and Cost Benefit Analysis Activity

Kristine Kingery
Director, Army Sustainability Policy
Office of the Deputy Assistant Secretary of the Army
(Energy & Sustainability)

Report Documentation Page

Form Approved
OMB No. 0704-0188

1. REPORT DATE	2. REPORT TYPE	3. DATES COVERED
31 OCT 2011		**00-00-2011 to 00-00-2011**

4. TITLE AND SUBTITLE	5a. CONTRACT NUMBER
Army Net Zero Installation Initiative and Cost Benefit Analysis Activity	5b. GRANT NUMBER
	5c. PROGRAM ELEMENT NUMBER
6. AUTHOR(S)	5d. PROJECT NUMBER
	5e. TASK NUMBER
	5f. WORK UNIT NUMBER
7. PERFORMING ORGANIZATION NAME(S) AND ADDRESS(ES) **Office of the Deputy Assistant Secretary of the Army (Energy & Sustainability),1400 Defense Pentagon,Washington,DC,20301-1400**	8. PERFORMING ORGANIZATION REPORT NUMBER
9. SPONSORING/MONITORING AGENCY NAME(S) AND ADDRESS(ES)	10. SPONSOR/MONITOR'S ACRONYM(S)
	11. SPONSOR/MONITOR'S REPORT NUMBER(S)

12. DISTRIBUTION/AVAILABILITY STATEMENT
Approved for public release; distribution unlimited

13. SUPPLEMENTARY NOTES
Presented at the GreenGov Symposium, October 31 - November 2, 2011, Washington, DC

14. ABSTRACT

15. SUBJECT TERMS

16. SECURITY CLASSIFICATION OF:			17. LIMITATION OF ABSTRACT	18. NUMBER OF PAGES	19a. NAME OF RESPONSIBLE PERSON
a. REPORT **unclassified**	b. ABSTRACT **unclassified**	c. THIS PAGE **unclassified**	**Same as Report (SAR)**	**14**	

Overview

- **Net Zero Installations Initiative**
  - Energy
  - Water
  - Waste
- **Cost Benefit Analysis Plan**
  - Initiative level
  - Army installation level

Net Zero Installations

"The primary goal is a focus toward net zero and when we talk about net zero, it's not only net zero energy, but it's net zero energy, water, and waste. When you look at the term "net zero" or a hierarchy of net zero you must start with reduction, then progress through repurposing, recycling, energy recovery, disposal being the last."

— HON Katherine Hammack, DoD Bloggers Roundtable, 10 October 2010

- ***A Net Zero ENERGY Installation*** *is an installation that produces as much energy on site as it uses, over the course of a year.*
- ***A Net Zero WATER Installation*** *limits the consumption of freshwater resources and returns water back to the same watershed so not to deplete the groundwater and surface water resources of that region in quantity or quality.*
- ***A Net Zero WASTE Installation*** *is an installation that reduces, reuses, and recovers waste streams, converting them to resource values with zero solid waste to landfill.*
- ***A Net ZERO INSTALLATION*** *applies an integrated approach to management of energy, water, and waste to capture and commercialize the resource value and/or enhance the ecological productivity of land, water, and air.*

Net Zero Installations

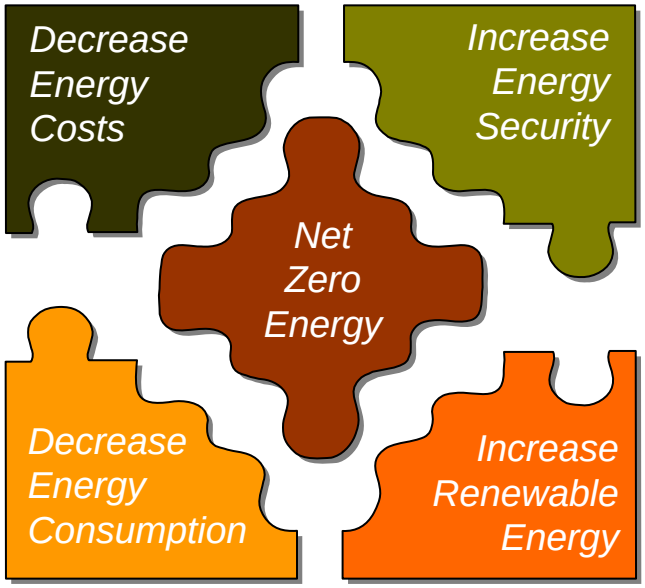
Net Zero Energy

A Net Zero ENERGY Installation *is an installation that produces as much energy on site as it uses, over the course of a year.*

Goals:

- Address energy efficiency & conservation first
- Preference for use of renewable energy for on-site power; enables operation if grid goes down
- Must address redundant energy supply sources
  - Can the installation function for long periods of time during supply disruptions affecting the electric grid, natural gas pipeline, propane & fuel oil deliveries, etc.
- Applies to both electrical & thermal energy
- Must include culture & behavior change
- Must be fiscally responsible

Net Zero Energy Strategy



Requires holistic approach & includes:

- Dramatic demand-side energy use reduction
- Right mix of energy generation technologies & strategies that also increase energy security
- Areas/building clusters served by small Central Utility Plants
- Clear & flexible implementation strategies based on potential technology innovations & mission changes

Need to build & retrofit our building stock today with future energy targets in mind

Getting to NZ Energy in 9 Years

Integrate energy considerations into Master Planning	Develop an energy component as part of the Installation's master planning process
Increase energy efficiency in new construction	Increase the use of energy technologies in construction & major renovation projects that provide the greatest cost-effectiveness, energy efficiency, & support the Army's sustainability objectives
Reduce energy consumption in existing facilities	Eliminate energy inefficiencies that waste natural & financial resources, & do so in a manner that does not adversely impact mission or the comfort & quality of the facilities in which Soldiers, Civilians, Families, & contractors work & live
Reduce dependence on fossil fuels	Reduce dependency on fossil fuels by increasing use of clean, renewable energy, reducing waste, increasing efficiencies, & improving environmental benefits
Improve energy security	Improve the security & reliability of our energy systems to provide dependable utility service, while decreasing dependence on a fragile electric grid

Net Zero Water

A Net Zero WATER Installation *limits the consumption of freshwater resources & returns water back to the same watershed so not to deplete the groundwater & surface water resources of that region in quantity & quality over the course of a year*

Goals:

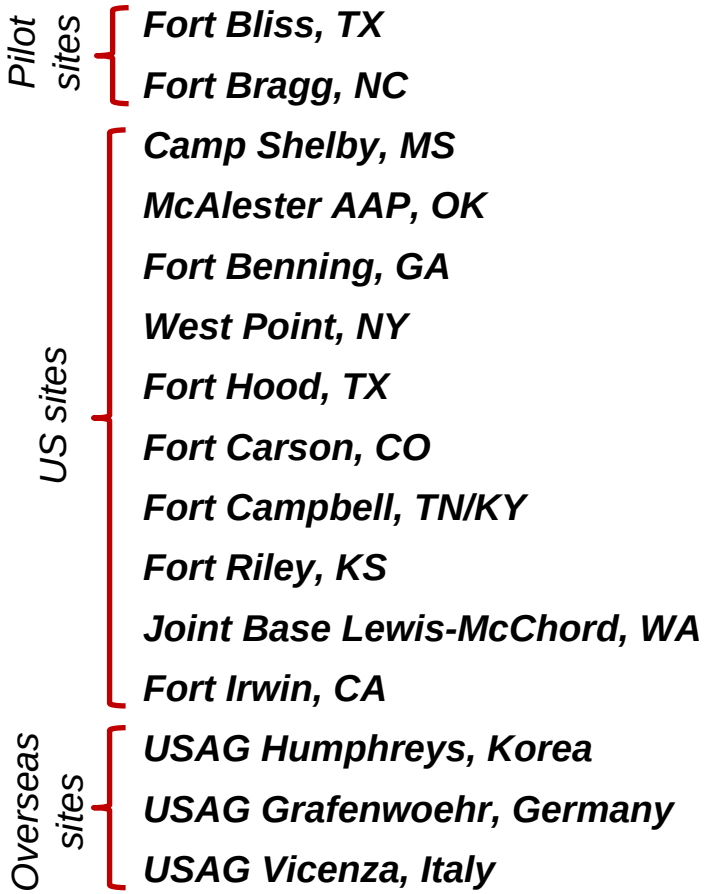
- *Reduce freshwater demand through water efficiency & conservation*
- *Access/develop alternate water sources to offset freshwater demand*
- *Develop water-efficient green infrastructure*
- *Implement low-impact development to manage stormwater*

Elements of Net Zero Water

Water conservation & efficiencies	▪ Identify & eliminate water inefficiencies (e.g., distribution system losses, evaporation losses) ▪ Implement low-impact development strategies that retain stormwater runoff ▪ Implement a water conservation awareness campaign to change employee behavior
Water reuse	▪ Implement water reuse strategies ▪ Include gray-water systems in new building designs where cost effective
Water security	▪ Improve the security & reliability of our water systems to provide dependable water service to critical infrastructure during external service disruptions ▪ If served by public water systems, establish alternate water supplies

Long-Term Regional Water Studies

- **Assess 30-year water supply & demand for 15 regions with Army installations**
  - Methodology developed in FY09 at 2 pilot studies
  - Applied to 10 US installations & 3 overseas installations



Net Zero Waste

A Net Zero WASTE Installation *reduces, reuses, & recovers waste streams, converting them to resource values with zero solid waste to landfill over the course of a year*

Goals:

- *Eliminate unnecessary purchase of materials*
- *Minimize amount waste generated wherever feasible*
- *Expand efforts to re-purpose & recycle/divert used materials*
- *Use Waste-to-Energy technologies for waste that can't be avoided, re-purposed, recycled, or composted*
- *Eliminate landfill disposal to the maximum extent feasible*

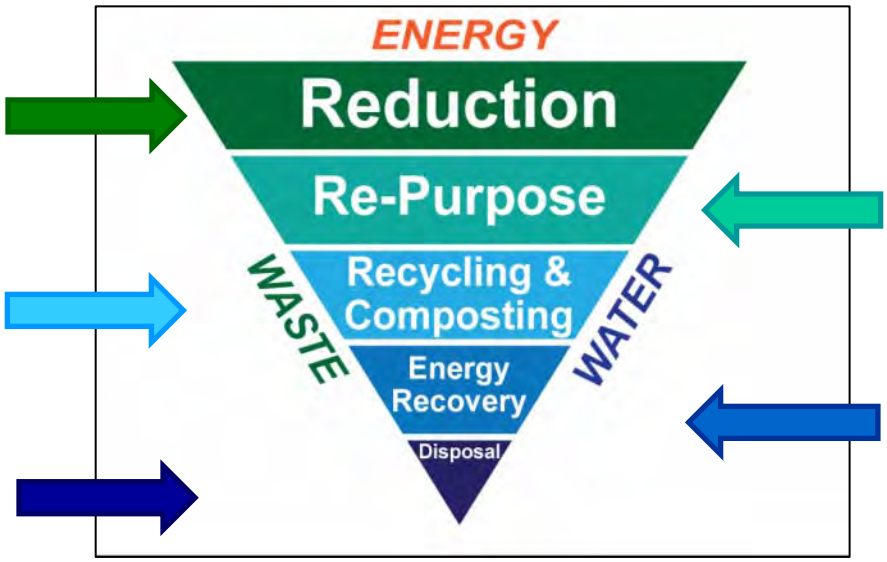
Net Zero Waste Hierarchy

Pilot Installations should have a comprehensive program that starts at the top of the hierarchy

Waste avoidance via procurement practices & other P2 efforts

All recyclable or compostable waste collected & diverted (to on- or off-post facilities)

WTE ash (if not further diverted) & any limited special wastes



Installation re-use centers & efforts to match waste stream 'products' with potential users (e.g., crushed drywall used for soil amendment; C&D debris reuse)

Waste that can't be re-used, recycled, or composted is sent to a WTE plant (on- or off-post)

Cost Benefit Analysis Plan

- G8 and ASA (I,E&E) currently investigating specific areas of Army mission through the Army Strategic Analysis process agreeing on an Energy Security Investment focus, to reduce reliance on fossil fuel.
- ASA (I,E&E) in league with the U. S. Department of Energy (DOE) and its National Renewable Energy Laboratory (NREL) is accomplishing the **"Energy Security Investment"** ***Business Case Analysis (BCA)*** toward secure / uninterrupted energy for: Installations, Tactical Operations, and Soldier Training
- Once an overall Army BCA is accomplished then the focus lens will realign to specific Army areas of interest (e.g. Net Zero and its specific projects)
- Coinciding with the ASA (I,E&E) and DOE NREL BCA, Army installations will accomplish Life-Cycle Costing (LCC) for economic evaluation of energy / water conservation projects and renewable energy projects per DOE LCC Manual, US Code Title 10, GAO Cost Estimating and Assessment Guide, & Army CBA Guide.
- Establish policies that coincide with BCA, Cost Benefit Analyses (CBA), LCC, etc.

QUESTIONS